

US EPA ARCHIVE DOCUMENT

# Energy Management Workshop



**October 5, 2010**

Las Vegas, NV



# Sponsors



U.S. EPA, Region 9

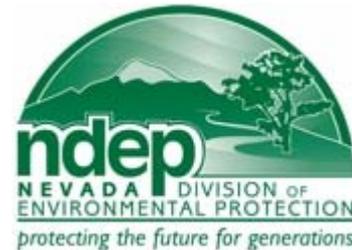
WaterSmart 2010

Nevada Energy

Southern NV Water Authority

NV Water Environment Association

NV Dept of Environmental Protection



SOUTHERN NEVADA  
WATER AUTHORITY



# Agenda

- Introductions
- Overview
- Four Sessions
  - Session 1: Is Something Broke? (PLAN)
  - Session 2: Finding Opportunities (PLAN)
  - Session 3: How to Fund Opportunities (DO)
  - Session 4: Ready to Use Energy Technologies (CHECK and ACT)
- Lunch : Minden-Gardnerville, Millbrae, and SNWA Renewable Energy Experiences

**How much energy do we  
use and where do we  
use it?**





# Energy Use and Water Utilities

**Water and Wastewater treatment represents ~3% of the nation's energy consumption**

- \$4 billion spent annually for energy
- Equivalent to ~56 billion kilowatt hours (kWh)
- Equates to adding ~45 million tons of greenhouse gases

**Energy represents the largest controllable cost of providing water or wastewater services to the public**

- 16,583 municipal treatment plants in the US
- Energy represents 25-30% of total plant O&M
  - Raw sewage pumping (12%)
  - Aeration (25%)
  - Solids handling (30%)
  - Lighting, heating, AC and other (6%)
- As energy costs rise, operating costs rise



# Energy Reduction at Water Utilities

## Water and Energy Efficiency at Utilities =

- Reduced energy usage
- Reduced operating costs
- Reduced climate impacts / carbon footprint
- Sustainability of water infrastructure
- Water savings

# Why Focus on Energy Management?

- Energy issues are here to stay and will only get more serious—no quick fixes!
- Individual projects are fine, but something is needed to pull it all together (a system)
- Systematic management will ensure continuing focus on energy efficiency
- The Plan-Do-Check-Act approach has worked in many different sectors
- Enables consistent, organized, and integrated management of utility operations

# What Energy Challenges Do You Face Today?

- What have you done already?
- What is missing?



# Managing to Maximize Energy Efficiency

## Ensuring a Sustainable Future: An Energy Management Guidebook for Wastewater and Water Utilities



JANUARY 2008



## Designed to help utilities:

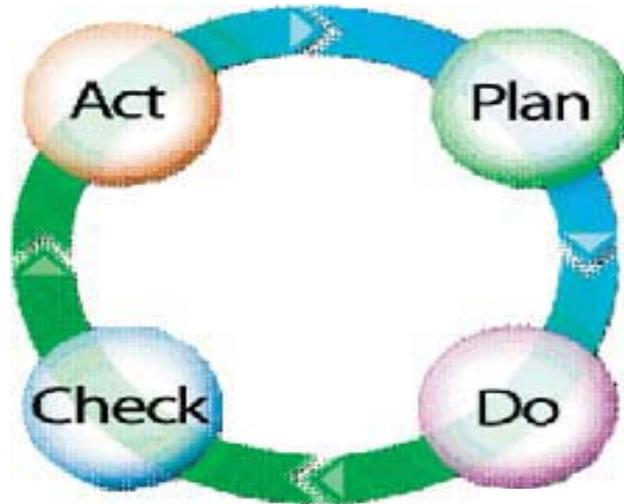
- Systematically assess current energy costs and practices
- Set measurable performance improvement goals
- Monitor and measure progress over time

**Uses a management system approach for energy conservation, based on the successful Plan-Do-Check- Act process [based on Environmental Management Systems (EMS)]**

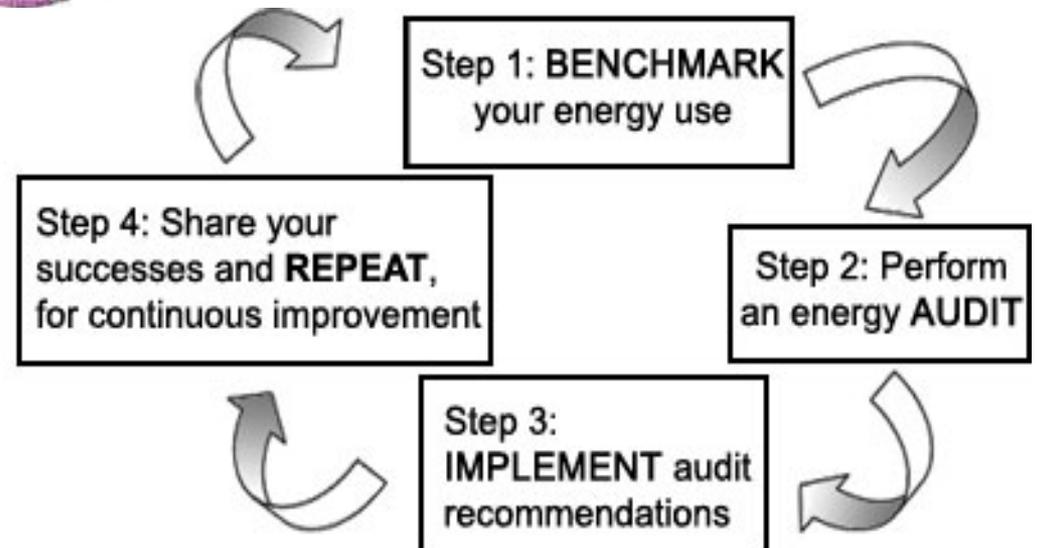
# Plan Do Check Act



# The PLAN-DO-CHECK-ACT Framework



## CONTINUOUS IMPROVEMENT



# Plan

- 1: Getting Ready
- 2: Assessing Current Energy Baseline
- 3: Establishing Energy Vision & Priorities
- 4: Identify Objectives and Targets



# Do

- 5: Implement Energy Improvement Programs (and a Management System to Support Them)

# Check & Act

- 6: Monitor & Measure Energy Improvement Management Programs
- 7: Maintain, Improve & Communicate

- **PLAN:**

Say what you do.

- **DO:**

Do what you say.

- **CHECK & ACT:**

Verify, Maintain and Continue



Ensuring a sustainable future requires a commitment to continuous improvement

# Plan

- Get Management Support
- Develop Cross-Agency Team
- Conduct Energy Audit
- Prioritize Projects from Audit Results
- Consult Other Agencies
- Set Objectives and Targets
- Define Performance Measures (so you can “Check” success later)

# Do

- Create Action Plan/Initiate Projects
- Locate Sources of Funding
- Apply for Funding
- Design Project (if applicable, conduct energy audit)
- Develop Energy Management SOPs after Construction

# Plan

- Get Management Support
- Develop Cross-Agency Team
- **Conduct Energy Audit**
  - Typically identifies capital and operational opportunities and calculates payback period
  - Keep in mind, audit can be conducted on designs – very effective
  - Many operational improvements can be made with little-to-no upfront capital costs
    - Time of operation, load demand contracts, unnecessary equipment, etc.

# Plan - Where Do You Start?

- **Prioritize Projects from Audit Results**

**Low hanging fruit?**

**Projects with rebates?**

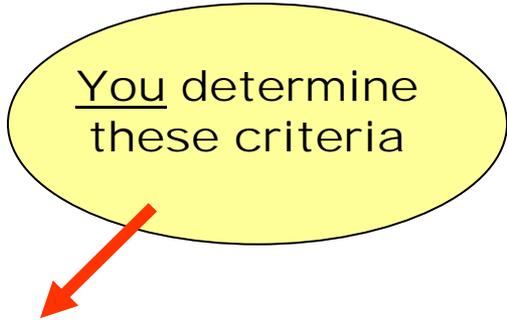
**Low cost projects?**

**What the GM wants?**



# Select Ranking Criteria

You determine these criteria



ACTIVITY	Reg	Impact	Toxic	Easy	ROI	Cost	Total	Sig?

Key: 5 = high    3 = moderate    1 = low    0 = N/A

**SAMPLE ENERGY PRIORITY RANKING TABLE** (Guidebook, page 40)

Ranking Criteria to Set Priorities								
Activity	Current/ Projected Costs	Feasibility of Energy Efficiency Projects	Costs to implement	Availability of Funding	Rate of Return on Investment	Environmental Benefit	Regulated?	Total Score
	1= Low 3= Medium 5= High	1= not feasible 3= feasible 5= Very feasible	1= High 3= Medium 5= Low	1=Capital \$ req'd 3=not known 5=\$\$ available	1= >5 years 3= 4 years 5= <3 years	1=none 3=some 5=sig. benefit	0=No 3=Yes 5=Yes / issues exist	
<b>Heating, Ventilation and Air Conditioning</b>								
heating - new boilers	3	5	1	1	2	4	0	16
air conditioning - install new	3	3	1	1	1	3	0	12
weatherstripping, caulking	1	5	5	5	5	3	0	24
								0
<b>Lighting</b>								
Replace lighting to T-5								0
Replace incand w/CFL								0
Install 6 skylights								0
								0
<b>Pumps</b>								
Replace pump #1								0
Retrofit pump #2								0
								0
<b>Vehicles</b>								
Replace 3 trucks w/hybrid trucks								0
								0
								0
<b>Renewable Energy</b>								
Install solar panels								0
								0



# Worksheet Exercise

# How do we move into action?



# Definitions: Objectives and Targets

- **Objectives**: goals that are consistent with the organization's policy
- **Targets**: performance measures related to and supporting a specific objective.
  - Targets should be **quantitative, realistic, measurable**

**What are you going to do,  
by how much, by when?**

# Turning objectives into action

## Energy Objectives

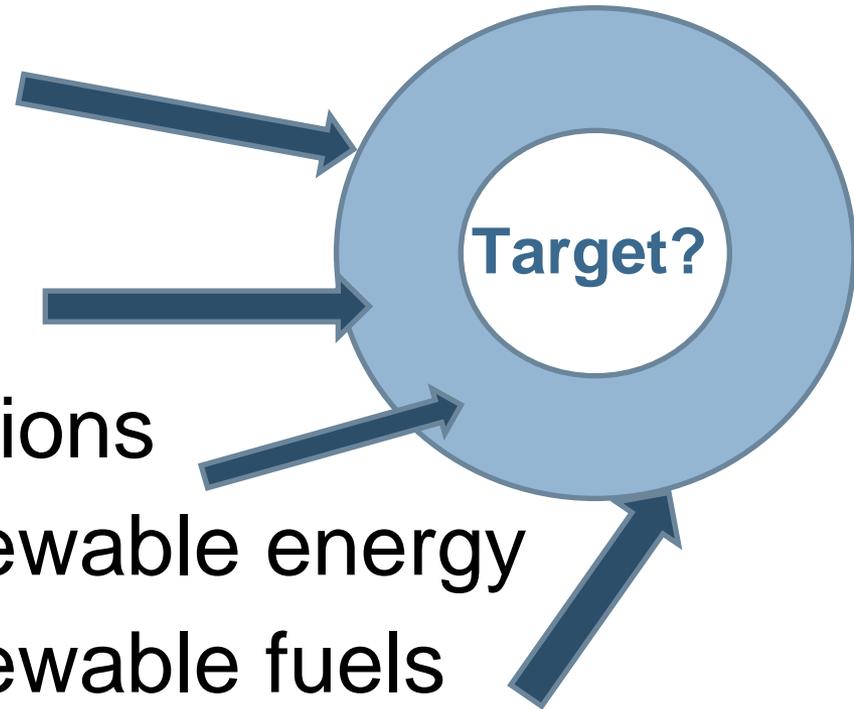
Reduce energy cost

Reduce fuel use

Reduce GHG emissions

Increase use of renewable energy

Increase use of renewable fuels



# Examples of Objectives & Targets

- Reduce overall energy cost by 10% by January 2011
- Increase energy purchased or generated from renewable sources of energy by 10% by 2012
- Reduce GHG emissions 20% by 2015

<b>OBJECTIVE</b>	<b>TARGET</b>	<b>PERF. INDICATOR</b>
Reduce Energy use	Reduce overall energy use by 10% by Jan 2011	kWh

# Why Performance Measures Matter

- How well are you doing?
- How do you know how well you are doing?
- How can you demonstrate to others how well you are doing?

**What gets measured gets managed;  
...and...**

**What gets managed gets DONE.**

# Moving to Action with Energy Improvement Management Programs

- What to do to reach the target
- Who will do it
- When to do it by
- What resources or level of effort are needed

*Good Project Management!*  
*(Page 53)*



# Are We There Yet?

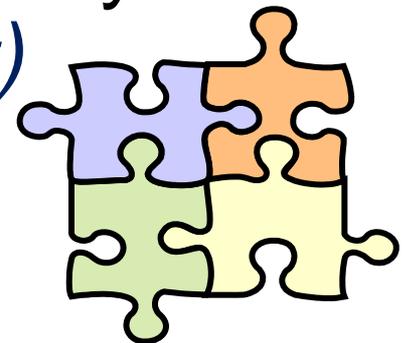


# Plan (Revisiting)

- Get Management Support
- Develop Cross-Agency Team
- Conduct Energy Audit
- Prioritize Projects from Audit Results
- Consult Other Agencies
- Set Objectives and Targets
- Define Performance Measures (so you can “Check” success later)

# Putting it all together....

- Congratulations! Your utility just got a large energy grant, the \$\$ to be spent over the next 2 yrs to develop a sustainable energy management effort that can produce energy improvements now and on into the future. You have to write a **program plan** for how you will move forward. *(handout)*





- Workbook and more information is available at:

<http://www.epa.gov/region09/waterinfrastructure/index.html>

Eric Byous

EPA Region 9

Sustainable Infrastructure Office

415-972-3531 [byous.eric@epa.gov](mailto:byous.eric@epa.gov)